

NATURALIST NOTEBOOK

DECEMBER 1972



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DECEMBER 1972

VOLUME VIII

NO. 10

FRONT COVER:

ORION

Tri-X film, 60 seconds at
f/1.4, using 55mm lens

Photo by Don Treworgy

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THE STAR OF BETHLEHEM

DEC 18 1972

By Don Treworgy

With the arrival of colder weather, early sunsets, the first snow, and the constellation Orion in the early evening sky, New Englanders begin to think of Christmas. Indeed looking at the multitude of bright stars in the winter sky causes one to wonder which of these luminaries was the star followed by the wise men at the time of Jesus' birth.

The answer to this question proves, after much research, to be extremely elusive. To persons living in the twentieth century, determining the date of an important date in modern history is almost trivial, so many good records are available. The date of Jesus' birth, however, is determined primarily on scriptural exegeses and one passage in *Antiquities of the Jews* by the first century author Flavius Josephus.

It is stated in the second chapter of the gospel according to St. Matthew that Jesus was born in the town of Bethlehem, in the land of Judea, during the time when Herod was king. Josephus wrote that Herod died shortly after an eclipse of the moon. Through a knowledge of the orbits of the earth and the moon, one can compute when eclipses have occurred in the past. Of the lunar eclipses which took place in the period from 10 BC to 10 AD, some were not visible in the Holy Land and can thus be eliminated from consideration. The most likely eclipse, all things considered, is that of 13 March 4 BC, although this cannot be established beyond all doubt. Accepting this date, one must conclude that Jesus was born sometime earlier than March of 4 BC.

Errors in establishing our calendar system in the sixth century AD account for why Jesus was not born in the year one. He could

not have been born in the year zero as there was not even a symbol for the concept of zero in the European number system of that time. The season of the year was likely spring, as St. Luke mentions that the shepherds were in the fields watching over their flock by night; this was done in the spring.

Having determined an approximate date for Jesus' birth, it becomes necessary to see what astronomical events took place near that date that might have had special meaning to the wise men.

A number of possible explanations of the "star" have been set forth down through the years. A meteor or "shooting star" would be of too short duration to have been visible to the wise men for the period of their long journey.

Comets, although visible for relatively long periods of time, were invariably considered evil omens, not appropriate for the birth of a king.

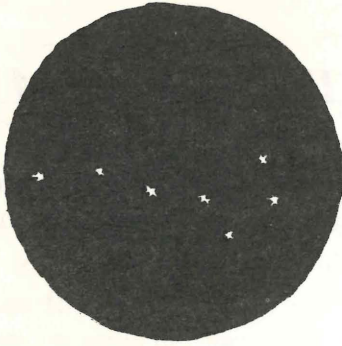
From time to time, a star will increase tremendously in brightness due to internal changes in the star. Such a star is called a "nova". Two novae are reported in Chinese records near this time: one in 5 BC and the second in 4 BC, making this a possible explanation of the "star".

The most plausible explanation of the Star of Bethlehem involves the planets. As a planet revolves around the sun, its position among the background stars changes. Each planet apparently moves at its own speed. Whenever two planets passed each other in the sky or stood in conjunction, this was thought to have special meaning. When conditions are exactly right, Jupiter and Saturn will be seen to pass each other three times in the space of a few months. This event happens at intervals averaging 128 years; being relatively rare, such occurrences would have been regarded as having tremendous importance. Such a triple conjunction took place late in 7 BC. The dates of the conjunctions were May 27, October 5, and December 1.

Looking into the eastern sky on the early nights of December 1972, one will see Saturn shining with a steady untwinkling light just north of the three stars in Orion's belt. Was this planet perhaps part of the event or "star" which started the wise men on their long journey to Bethlehem?

ABOUT THE AUTHOR:

Don Treworgy is the Supervisor of the Planetarium at Mystic Seaport. He points out that the streaking of the stars in the cover photo is due to the movement of the stars during the exposure time.



THE GREAT BEAR

An Algonkian Legend

Told by Gladys Tantaquidgeon



At this season of the year when red, yellow, and brown leaves are falling from the trees and soon a blanket of snow may cover the ground, we are reminded of a story our elders told us about The Great Bear (*Ursa major* or the "Big Dipper").

Many years ago, a Great Bear was causing trouble in the village, killing animals and people. The leaders called a meeting and three hunters agreed to kill the Bear. The first hunter was armed with his bow and arrows; the second carried a bundle of fagots for kindling a fire; and the third hunter, accompanied by his little dog, carried a pot in which to cook the meat. The three hunters stalked the Great Bear, but through its magic power, the Great Bear fled the earth and drew the hunters skyward in a magic net. Now, in the season of the Hunter's Moon, as we look at the sky, we see the Great Bear (Big Dipper) being chased by three hunters. The four stars (the bowl of the dipper are the paws of the Great Bear. The stars in the handle are the three hunters. The small star near the third hunter is his little dog. As they chase the Great Bear across the sky, the first hunter shoots it; the blood and grease dripping on the leaves color them red, yellow and brown. As the grease hardens on the cold ground, it turns white (snow). In the spring, the Great Bear and the three hunters are given life, and the hunt is resumed until the season of the Hunter's Moon in the fall.

ABOUT THE AUTHOR:

Gladys Tantaquidgeon is a direct descendant of Uncas, Chief of the once powerful Mohegan Nation. She and Harold Tantaquidgeon maintain a unique Indian Museum in Uncasville, dedicated to the purpose of preserving and perpetuating the history and traditions of the Mohegan and other Indian tribes.

TIME AND TIDE

WAIT FOR NO MAN

*Text and Illustrations
by Barbara Kashanski*

How true this old saying is! Time and tides are beyond the control of man and in the 'hands' of the earth, the sun, and the moon. Let's see how this is so.

The earth circles (orbits) around the sun in $365\frac{1}{4}$ days and this orbit establishes the length of our year. At the same time the earth is orbiting the sun, it is turning around and around (rotating) on its own axis. One complete rotation of the earth takes 24 hours and we have the length of our day. While all this is going on the moon is taking a trip for itself around the earth. The moon's trip (orbit) takes $29\frac{1}{2}$ days, which is the length of our month. Or if you want it all in a nutshell:

1 earth rotation on its axis = 1 day

1 moon orbit around the earth = 1 month

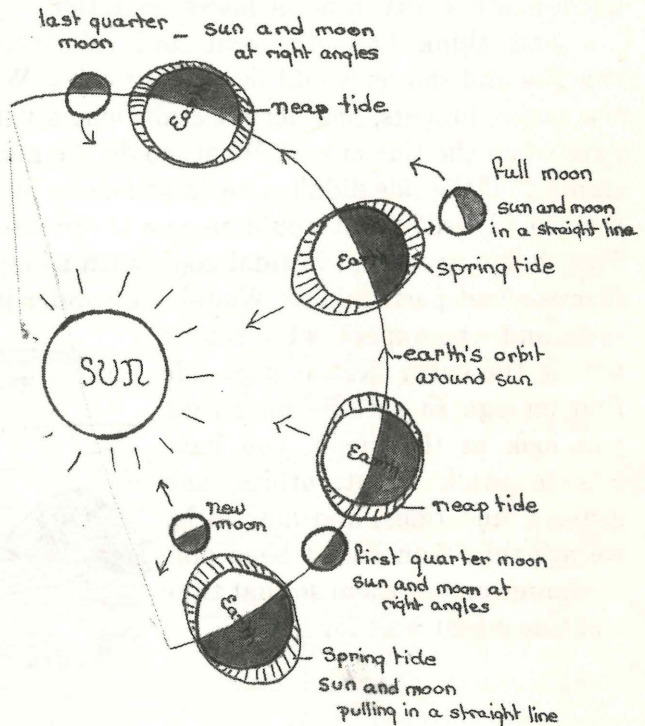
1 earth orbit around the sun = 1 year

I can hear you say—well, what happened to the 'week?' The history leading up to our week is long and involved. This period of time roughly corresponds with the moon's quarter phases, which come every 7 or 8 days. Also, there are ancient planetary concepts and religious origins associated with the seven days of creation.

Briefly that takes care of time; what about tides? To understand about tides, it is necessary to understand the universal law of gravity, which Issac Newton revealed to the world in 1687. It is the force (or pull) of gravity that holds the sun, the moon, and earth in their places in the universe. Without gravity holding the planets in position, there would be no periods of time as we know them, for the planets would not be able to orbit around each other and would be shooting off in all directions. Not only does gravity hold the sun, moon, and earth in place, but it is the moon's gravitational pull that causes tides. Both the sun's and the moon's gravitational forces are pulling on the earth, but because the moon is 92,761,143 miles CLOSER to the earth than the sun, it is the gravity of the moon that

affects the earth's surface.

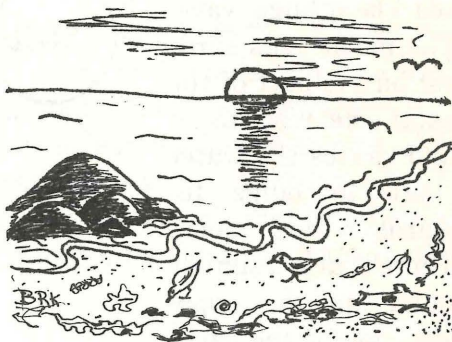
How does the moon's gravity cause tides? About $\frac{3}{4}$ of the earth's surface is covered with water. Water is a liquid and free to move about. So, as the gravity of the moon pulls on the earth's surface, it pulls the water towards it, lifting the sea like a huge wave. The moon pulls hardest on the part of the earth nearest to it and causes the water there to bulge towards the moon. There is also a similar bulge on the opposite side of the earth which is more difficult to explain, but has to do with the centrifugal effect of



the rotating earth-moon system. It is the 'bulge' on opposite sides of the earth that causes high tides. Most parts of our country have two tides a day and two low—semi-diurnal—tides. But there are some sections of coastline, such as the Gulf of Mexico, that have only one high and one low tide a day—a diurnal tide. When the gravitational forces of the sun and moon are pulling in a straight line on the waters of the earth, very high tides or spring tides occur. This happens twice a month—during the new moon and the full moon. So when you hear of a spring tide, it has nothing to do with the season of the year. It refers to the very high tides all year that happen during new and full phases of the moon, when the sun adds its gravitational pull to the moon's. Know what a neap tide is? When the sun and moon are at right angles to each other and are pulling at the earth's surface in *separate* directions rather than together, as

during a spring tide, the result is a neap tide. Now a neap tide is NOT a low or ebb tide. It is the minimum range tide that occurs twice a month during the first quarter moon and the last quarter moon. During a neap tide the high water mark is at its lowest, or to put it another way, it is the lowest high tide.

Just think how different and relatively uninteresting our beaches and shores would be without tides. What would happen to the snails, limpets, and hermit crabs who scurry about in search of food when the tide is low? What would the mussels, barnacles, and clams do if the tide didn't come in and cover them with water so that they could feed? What would happen to the fascinating creatures we find shuffling around in tidal pools such as hermit and rock crabs, starfish and periwinkles? Would the sanderlings, turnstones, plovers and sandpipers who search among the debris left at high tide find enough to eat? So next time you look at the moon, you have lots to think about: orbits, and gravity, and tides, and how lucky we are that man hasn't been able to change any of them so that time and tide might wait for him!



WHY CUT A TREE THIS CHRISTMAS?

The following suppliers have live trees suitable for indoor use followed by transplantation outdoors. All of them have indicated a willingness to provide instructions for this to the novice.

Al Seifert's Nurseries, Baltic Road, Baltic

Brouwer's Flower Shop, Flanders Road, East Lyme

*Chiapperini's Pleasant Valley Garden Center, Route 12,
Groton*

*Holdridge's Farm Nursery, Ledyard Center, Ledyard
New London County Nurseries, Route 184, Stonington*

OH, SAY, CAN YOU SEE . . .

by Frank R. Haeni

As we look towards the heavens, our eyes blink several times and start watering. No, it's not the bright sunlight that beams down upon the earth. It is a menace that is plaguing not only the United States but also the world—it's called AIR POLLUTION.

People have been aware of the Los Angeles smog for many years. Unfortunately, only a small percentage of the populace is aware that air pollution affects us whether we live in the large cities such as New York, Sydney, or Bonn, or the small communities of Essex, Ledyard, or Stonington.

Each day the harmful effects of air pollution become evident to us. Each day we breathe in more harmful pollutants than the previous day. This is becoming a menace to public health. The polluted air contributes to the occurrence of upper respiratory diseases, including the common cold, bronchitis, asthma, emphysema, lung disease, and lung cancer. New York City alone has had a 500% increase in the emphysema mortality rate in the last ten years.

Within the past twenty-five years, various countries around the world have paid heavy tolls in the loss of human lives to this deadly menace. In Donora, Pennsylvania (1948), twenty people died and 5,900 became ill when atmospheric conditions trapped the pollution from nearby industrial plants over the city. In New York City (1953, 1963), more than 600 people died because of heavy periods of air pollution. In London (December, 1952), four thousand people died in one week due to "killer fogs." How many more headlines and deaths will the world incur before effective action is taken to alleviate the problem?

Air pollution in the United States is also costly in terms of the annual loss to agriculture. The National Air Pollution Control Administration estimates that we lose about \$325 million in crop damage and \$175 million in livestock.

If the problem continues unchecked, the prospects of a bright future are dim. It is estimated that the world population will double by the year 2000. At that time, 85% of the U.S. population will live in cities. The increase in population will help to clog the highways with more cars. The number of automobiles will increase, twice as fast as the number of people. The population will demand five times as much power as we now use.

What are the alternatives to all of this? Air pollution has developed from the patterns of a modern civilization which depends upon a high standard of living, as evidenced by our complex industry-transportation system which continues to increase the demand for electrical power. Elimination of pollution requires a modification of our life styles. Everyone must be willing to do this.

We will have to support and use public transportation, NOT highways or airports, but new and improved rail and bus services. New types of engines will have to be developed to replace the internal combustion engine. Factories and power plants will have to install devices further to reduce the number of pollutants that are being spewed from their stacks.

The costs for cleaner air are high, but the value of human lives is inestimable.

A CHRISTMAS TREE FOR THE BIRDS

A tree, decorated for the birds, will provide your feathered friends with a worthwhile Christmas gift. You may use your own discarded Christmas tree or a suitable evergreen shrub in the year. Put everyone to work making the colorful food decorations.

Sunflower head with seeds for chickadees, nuthatches, blue jays and cardinals.

For color, try half a pomegranate, Indian corn, strings or cranberries and popcorn.

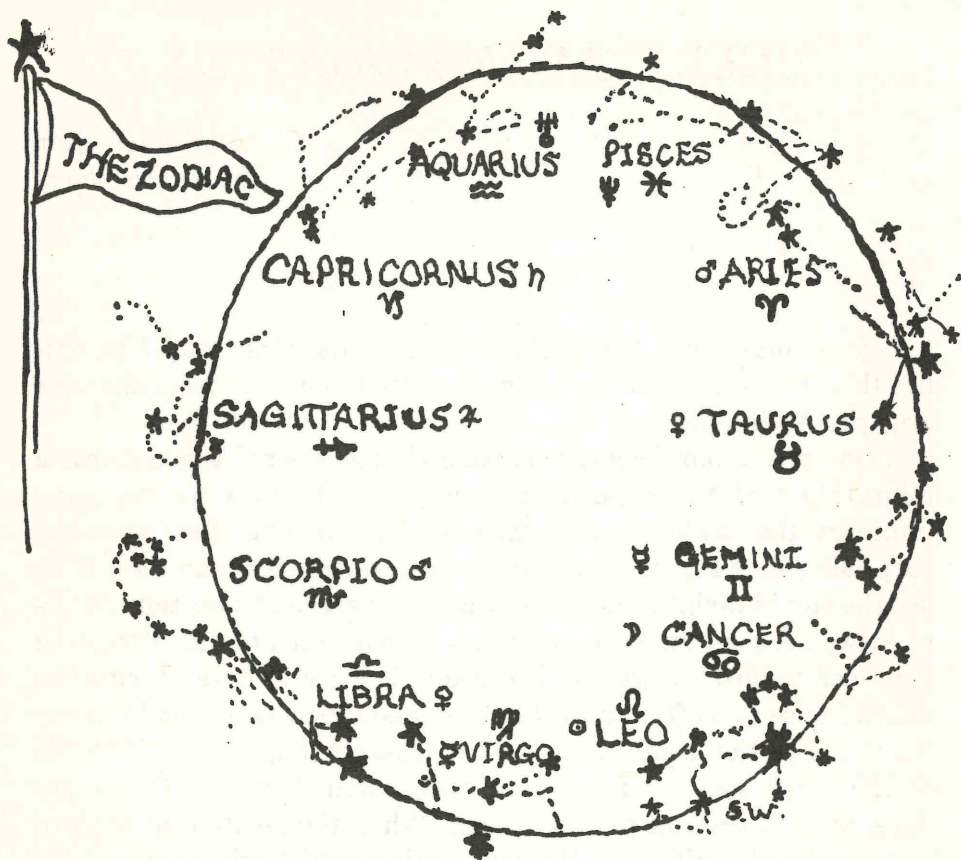
Sprigs of rose hips.

Fill empty orange, grapefruit or coconut halves with bird seed, raisins and suet.

Large chunks of suet for woodpeckers, chickadees, nuthatches.

Pine cones or logs (with holes) filled with a mixture of melted suet and bird seed.





The Zodiac is an imaginary circle of the stars' yearly path around the earth, and its parts are named for twelve ancient star constellations. The position of the sun, moon and planets at the time of your birth, astrologists say, influences your character and abilities through life.

*If you were
born between:*

March 21-April 19
April 20-May 20
May 21-June 20
June 22-July 22
July 23-Aug. 22
Aug. 23-Sept. 22
Sept. 23-Oct. 22
Oct. 23-Nov. 22
Nov. 23-Dec. 21
Dec. 22-Jan. 19
Jan. 20-Feb. 18
Feb. 19-March 20

*Your birth sign
is:*

ARIES (The Ram)
TAURUS (The Bull)
GEMINI (The Twins)
CANCER (The Crab)
LEO (The Lion)
VIRGO (The Virgin)
LIBRA (The Scales)
SCORPIO (The Scorpion)
SAGITTARIUS (The Archer)
CAPRICORN (The Goat)
AQUARIUS (The Water Bearer)
PISCES (The Fishes)

*Your ruling
planet is:*

MARS
VENUS
MERCURY
MOON
SUN
MERCURY
VENUS
MARS
JUPITER
SATURN
URANUS
NEPTUNE

by Shelley White

CELESTIAL NAVIGATION

*Text and Illustration
by Kathie Haeni*

Some organisms, particularly arthropods, birds, and fish, utilize their time-sense ability as an aid to find their way from one area or region to another.

One of the most dependable and changeless reference points a migrating bird could use in orienting itself is the *sun*—the same luminary that sailors use in their navigation. Therefore, it is not surprising that recent experiments have shown that some birds do use the sun in maintaining their migratory sense of direction. In the past two decades, much research has been devoted to this intriguing approach to bird navigation. Birds kept in circular cages during the migration season often show their restlessness by facing and fluttering in a direction conforming to that taken by migrating wild birds of the same species. They were disoriented, however, on cloudy days without the sun to guide them. When the position of the sun was artificially shifted by the use of mirrors, the orientation of the birds shifted correspondingly.

This provides some explanation for the orientation of “day migrants,” but what of the night-migratory species?

What time the daisy decks the green,

Thy certain voice we hear;

Hast thou a star to guide thy path

Or mark the rolling year?

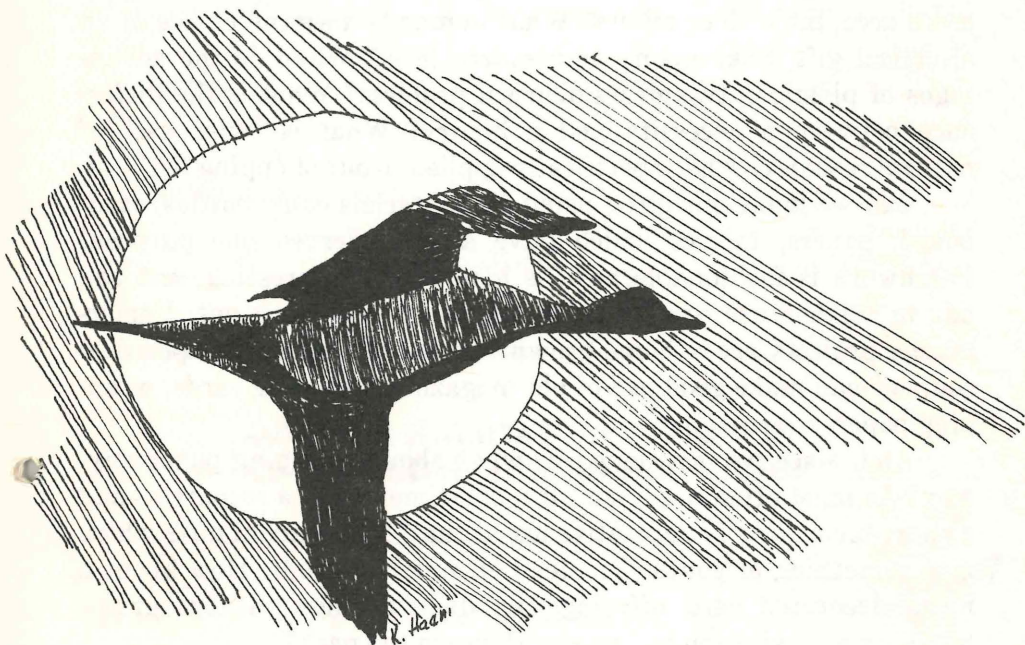
—John Logan, *To the Cuckoo*

John Logan’s verse was proven true through the experiments of a German scientist, E. F. G. Sauer.

Sauer proposed that nocturnal migrants apparently take their direction from the constellations of the stars. Sauer used a round cage with a clear top that permitted a direct view of the night sky. The birds appeared to orient themselves by the stars and as soon as clouds hid them, they became bewildered. Later the birds were exposed to an artificial sky in a planetarium. The birds took their directions from the stars and were easily duped when the constellations in the artificial heavens were shifted.

In principle, there are two ways to orient by the stars. A bird might locate one star or group of stars and fly at a particular angle relative to it, adjusting this angle with the same kind of "internal time-sense" that enables the day-migrant to steer by the sun. Or it might use the constant patterns of stars to locate a particular direction—just as we sight along the pointers of the Big Dipper to find the North Star. As long as such a pattern is visible, it is possible to determine north without knowing the time, season, or location. Different species of birds appear to employ one or the other of these methods.

Although there is increasing evidence that birds use celestial navigation in establishing the main direction of their travel, it still remains a mystery how they pinpoint their goals. There have been numerous setups employed to obtain more precise information about navigation, but the complete and clear answer to the riddle of migration awaits a young biologist of the future.



HOME ECOLOGY



As the holiday season approaches, it is not only appropriate, but ecologically responsible, for you to make conservation a part of all holiday activities.

Each of us, for instance, exercises almost complete freedom of choice (within our means, of course) when selecting gifts. Can each of us, then, temper this freedom with consideration of how our choices affect our planet, Earth? Might it not be wise to ask whether the materials used to make this item, or that, are degradable, whether they can be recycled, whether some uses of resources are more acceptable than others? What demands does the choice of an electrical gift make upon our resource level? When do the advantages of plastic outweigh its disposal problem? What is the difference between a necessity and a luxury? What is "wise use" of natural resources when specifically applied to our shopping list?

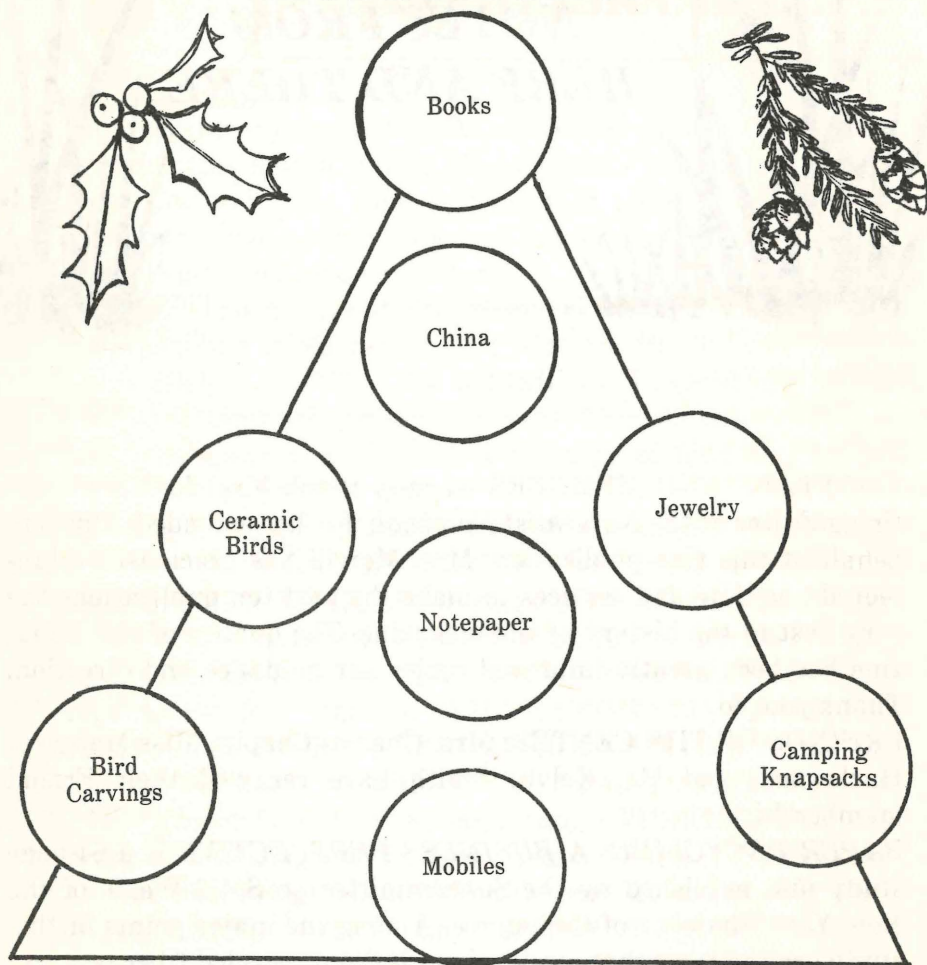
Can we make our gifts, using for materials cans, bottles, cardboard, papers, fabrics which have already served one purpose? Patchwork is fashionable now, is historically interesting, and can put to further use something which is not yet worn out. Papier-maché projects are a home-grown way to recycle newspaper. Découpage can make good use of old magazines, greeting cards, wrapping paper.

And, since we mentioned it, what about wrapping paper anyway? As most often used, isn't it a one-time use of a resource—and a short-term, largely decorative use at that? Think about gifts which give something of yourself instead of material goods. How about a nicely-decorated card offering "six dishwashings without grumbling" or an invitation to "walk with me in the park?"

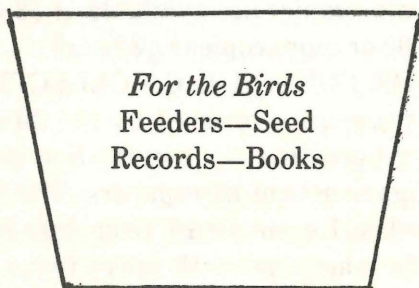
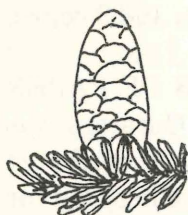
—Lois Kelley, Director of Conservation Education
Goodwin State Forest, Hampton, Connecticut

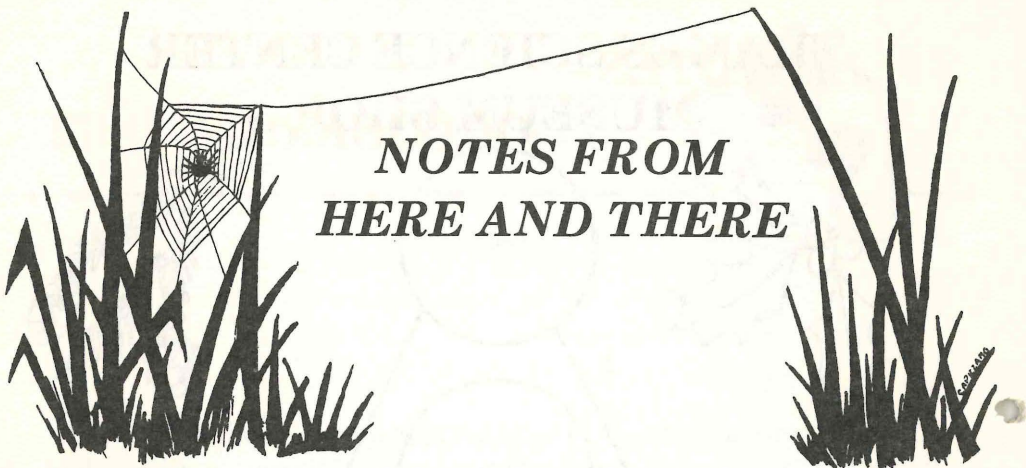
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NOTES FROM HERE AND THERE

TSC STAFF AND MEMBERS warmly thank Mrs. Jo Merrill, retiring Editor of the *Naturalist Notebook*, for her extended efforts in behalf of this fine publication. Mrs. Merrill has graciously volunteered her time and services to make the past ten publications the very best in the history of the magazine. The quality of the magazine has been greatly improved under her guidance and direction. Thank you, Jo.

FRIENDS OF THE CENTER: Mrs. Charles Chapin, Miss Margaret Hazlewood, and Mr. Kelvin Smith have renewed their Friend memberships.

PAPER RECYCLING: A BUSINESS PERSPECTIVE is a 64-page study just published by the Subcommittee on Solid Waste of the New York Chamber of Commerce. Among the major points of this study are the facts that products made from recycled fiber perform as well as, if not better than, virgin products; and that recycled paper products are available to customers at comparable costs. Copies of the study can be obtained from the Publications Division, New York Chamber of Commerce, 65 Liberty Street, New York City 10005. One to nine copies are available at \$3 each; 10-99 copies at \$2.50 each; and 100 or more copies at \$2 each.

THE FIRST OF THE CONTINUING COLLECTIONS OF PAPER for the recycling program sponsored by the Junior Curators was highly successful. Approximately twenty-five people contributed 6,700 pounds of magazines and newspapers. The Recycling Day for this month is Saturday, December 16, from 9:00-12:00. PLEASE tie your newspapers and magazines with heavy twine.

FIELD NOTES—

OCTOBER 5-31, 1972

An exceptionally early snowfall on October 19 was the weather highlight for this month. While *Homo sapiens* populations delight in an early winter treat such as this, such unusual weather disturbances can cause large numbers of animals to perish when they cannot find sufficient food or shelter.

A rare bird alert was put into effect when a WHITE-FRONTED GOOSE was found at Moonstone, R. I., October 29.

Large flights of EVENING GROSBEAKS moved into southeastern Connecticut around October 20-21. This is earlier than normal and may mean that there is a shortage of food in southern Canada for the birds to feed upon.

New London, Waterford, Norwich: PIPITS were seen in the Norwich area October 10. A LAUGHING GULL was found in Waterford feeding with HERRING GULLS during early October. Other Waterford observations include a MONK'S PARROT which stayed at a feeding station for five days; EVENING GROSBEAKS at several different areas; four unusual WHITE-CROWNED SPARROWS October 17 and 25; five BUFFLEHEAD DUCKS October 20; and one DUNLIN at Harkness. Additional bird sightings included a late PHOEBE October 25 and on the same date, a TURKEY VULTURE which was seen soaring over Hodges Circle where all of the construction for the new bridge is occurring. October 27 produced a YELLOW BREASTED CHAT, and another WHITE-CROWNED SPARROW was found at Harkness October 30. Four HOODED MERGANSERS at Rocky Neck Park were also observed on that same day and a COMMON LOON in Waterford on October 31.

Lyme, Essex: Birders on October 20 found many EVENING GROSBEAKS in both of these towns, as well as five TURKEY VULTURES seen in the Grassy Hill area of Lyme.

Mystic, Stonington: The Barn Island region was a productive birding area for this month. The following were all observed there: four LITTLE BLUE HERONS, a PIGEON HAWK, and a SHARP-SHINNED HAWK, all on October 8. Large flights of ROBINS, BLUE JAYS, EVENING GROSBEAKS, AMERICAN GOLD-FINCHES, and TREE SWALLOWS were seen overhead on October 21.

Rhode Island Shoreline: Observers at Napatree had some interesting sightings October 22, including four GREAT CORMORANTS, one COMMON GOLDENEYE, one COMMON EIDER, approximately 200 TREE SWALLOWS, and all five species of gulls that occur in these regions. These included the BONAPARTE'S, LAUGHING, GREAT BLACK-BACKED, RING-BILLED, and COMMON HER-RING GULLS. This was a treat, as the observers were able to make comparisons between the various gulls. The highlight of the month was the sighting of the rare WHITE-FRONTED GOOSE mixed in with two SNOW GEESE and 1,000 CANADA GEESE at Moonstone on October 29'

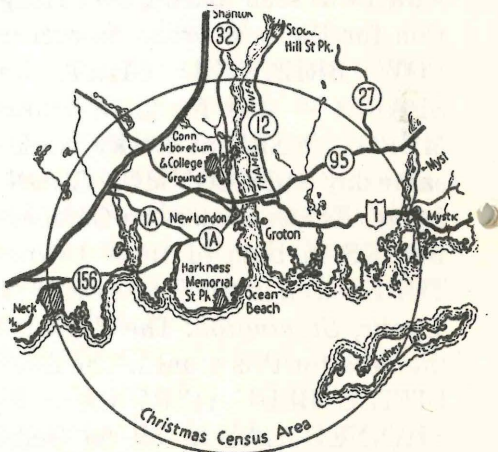
Contributors: G. Bissell, Mrs. A DeGange, F. Haeni, W. Grose, H. Kelsey, Mrs. A. King, R. Parker, Mrs. L. Williams.

CHRISTMAS BIRD COUNT

Once again, Bob Dewire of the Mid-Fairfield County Youth Museum will be leading birders in eastern Connecticut taking the annual Christmas Count in conjunction with the National Audubon Society on Saturday, December 30.

Chief Naturalist Frank Haeni will coordinate TSC members taking part. If you're interested in helping, call him at 442-0391. The Christmas count will be conducted regardless of the weather.

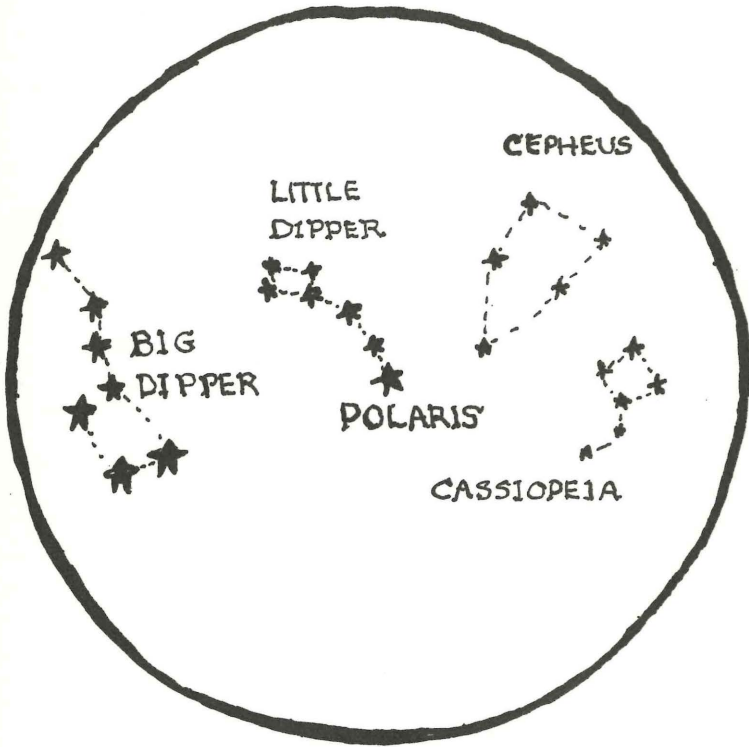
To make the census as accurate as possible, reports from feeding stations within the census area are desired. The map indicates the boundaries of this area. If you feed birds within this territory, please report the species and the number of each species you see on the day of the census. Count the largest number of each observed at any one time.



Make a *positive* identification before reporting a bird (don't count it if you aren't sure). At the end of the day, phone in your report to 443-6314.

A SKY DISCOVERY

Finding the North Star:



To find North in the sky, Look for the North Star, *Polaris*. *Polaris* means "Pole Star", above the North Pole.

First look for the Big Dipper, then for the two "pointers", the two stars on the edge of the Big Dipper.

Draw an imaginary line through the pointers and follow it until you see another group of stars in the Little Dipper. The brightest star, at the end of the handle of the Little Dipper, is the North Star. Another name for the Little Dipper is *Ursa minor*, which means "little bear."

by Shelley White

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